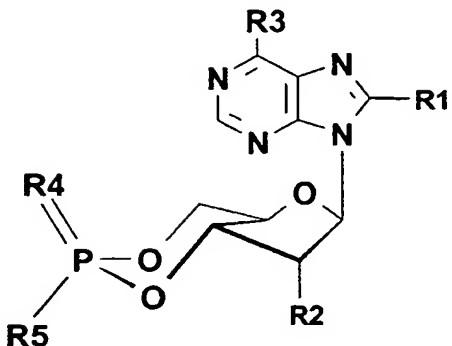


Claims

1. Compound having the structural formula (I)



5 and deaza-analogues thereof, wherein:

R₁ can be independently H, halogen, azido, alkyl, aryl, amido-alkyl, amido-aryl, OH, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, SeH, Se-alkyl, Se-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, cycloalkylamino;

10 R₂ can be independently H, halogen, azido, O-alkyl, S-alkyl, Se-alkyl, NH-alkyl, N-bisalkyl, alkyl-carbamoyl, cycloalkylamino, silyl;

15 R₃ can be independently H, halogen, OH, azido, amido-alkyl, amido-aryl, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, NH-alkyl-carbamoyl, cycloalkylamino;

and wherein

R₄ is O(H) or S(H); and

20 R₅ is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; or

R₄ is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; and

R₅ is O(H) or S(H);

and pharmaceutically acceptable salts, esters, and/or
25 solvates thereof,

with the exception of 2'-deoxyadenosine-3',5'-cyclic monophosphate; N⁶-monobutyryl-2'-deoxyadenosine-3',5'-cyclic

monophosphate; 2'-deoxyadenosine-3',5'-cyclic
monophosphorothioate;, 2'-deoxyadenosine-3',5'-cyclic
monophosphoroanilidate; 2'-deoxyadenosine-3',5'-cyclic
monophosphate methyl triester; 2'-deoxyadenosine-3',5'-cyclic
5 monophosphate ethyl triester; 2'-O-methyladenosine-3',5'-
cyclic monophosphate; ; 2'-O-ethyladenosine-3',5'-cyclic
monophosphate; 2'-O-n-propyladenosine-3',5'-cyclic
monophosphate; 2'-O-n-butyladenosine-3',5'-cyclic
monophosphate; 2'-O-iso-butyladenosine-3',5'-cyclic
10 monophosphate; 2'-O-methyladenosine-3',5'-cyclic
monophosphate methyl triester; 2'-O-methyladenosine-3',5'-
cyclic monophosphate phenyl triester.

2. Compound as claimed in claim 1, wherein
15 R_1 is H, halogen, azido, O-alkyl, O-aryl, S-alkyl, S-
aryl, NH-alkyl, NH-aryl, Se-aryl.

3. Compound as claimed in claim 1 or 2, wherein
R₁ is H, halogen, azido, O-alkyl, O-aryl, S-alkyl, S-
20 aryl, NH-alkyl, NH-aryl, Se-aryl.

4. Compound as claimed in claim 1, 2 or 3, wherein
R₁ is H, Br, Cl, I, azido, 2-chlorophenylthio, 3-
chlorophenylthio, 4-chlorophenylthio, 2-bromophenylthio, 3-
25 bromophenylthio, 4-bromophenylthio, methylamino, methylthio,
ethylthio, n-propylthio, n-butylthio, n-pentylthio, n-
hexylthio, 2-fluorophenylthio, 3-fluorophenylthio, 4-
fluorophenylthio, 4-methylcumarinyl, naphtyl-2-thio,
phenylthio, 4-nitrophenylthio, 2-aminophenylthio, 3-
30 aminophenylthio, 4-aminophenylthio, benzylthio,
phenylethylamino, 3-phenyl-propylamino, 2-methoxyphenylthio,
3-methoxyphenylthio, 4-methoxyphenylthio, isopropylthio,
benzimidazolyl-2-thio, 2-hydroxyethylthio, 2-aminoethylthio,
pyridinylthio, benzothiazolylthio, 2-methylphenylthio, 3-

methylphenylthio, 4-methylphenylthio, 2-isopropylphenylthio,
4-isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-
hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy, ethoxy,
propioxy, butoxy, benzyloxy, 4-methylbenzyloxy, 4-
5 methoxybenzyloxy, 4-fluorobenzyloxy, 4-chlorobenzyloxy, 4-
bromobenzyloxy, phenoxy, cyclohexylamino, benzylamino,
phenylseleno, 4-isopropyloxyphenylthio, 4-
methylthiophenylthio, 6-amino hexylamino, 2,3-
dichlorophenylthio, 2,5-dichlorophenylthio, 2,4-
10 difluorophenylthio, 2,5-dimethoxyphenylthio, 2,5-
dimethylthiophenylthio, 2,6-dimethylthiophenylthio, 2,6-
dichlorophenylthio.

5. Compound as claimed in any of the claims 1-4, wherein
15 R_1 is H, Br, Cl, azido, 2-chlorophenylthio, 3-
chlorophenylthio, 4-chlorophenylthio, 2-bromophenylthio, 3-
bromophenylthio, 4-bromophenylthio, methylamino, methylthio,
ethylthio, n-propylthio, n-butylthio, n-pentylthio, n-
hexylthio, 2-fluorophenylthio, 3-fluorophenylthio, 4-
20 fluorophenylthio, 4-methylcumarinyl, naphtyl-2-thio,
phenylthio, 4-nitrophenylthio, 2-aminophenylthio, 3-
aminophenylthio, 4-aminophenylthio, benzylthio,
phenylethylamino, 2-methoxyphenylthio, 3-methoxyphenylthio,
4-methoxyphenylthio, isopropylthio, benzimidazolyl-2-thio, 2-
25 hydroxyethylthio, 2-aminoethylthio, pyridinylthio,
benzothiazolylthio, 2-methylphenylthio, 3-methylphenylthio,
4-methylphenylthio, 2-isopropylphenylthio, 4-
isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-
hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy,
30 benzyloxy, cyclohexylamino, benzylamino, phenylseleno, 4-
isopropyloxyphenylthio, 4-methylthiophenylthio, 6-
amino hexylamino, 2,3-dichlorophenylthio, 2,5-
dichlorophenylthio, 2,4-difluorophenylthio, 2,5-

dimethoxyphenylthio, 2,5-dimethylthiophenylthio, 2,6-dimethylthiophenylthio, 2,6-dichlorophenylthio.

6. Compound as claimed in any of the claims 1-5, wherein
5 R₁ is H, Br, Cl, azido, 4-chlorophenylthio, methylamino, methylthio, 4-fluorophenylthio, 4-methylcumarinyl, naphtyl-2-thio, phenylthio, 4-nitrophenylthio, 2-aminophenylthio, benzylthio, n-hexylthio, phenylethylamino, 4-methoxyphenylthio, isopropylthio, benzimidazolyl-2-thio, 2-hydroxyethylthio, ethylthio, 2-aminoethylthio, pyridinylthio, benzothiazolylthio, 4-methylphenylthio, 3-methoxyphenylthio, 4-isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy, benzyloxy, cyclohexylamino, benzylamino, phenylseleno, 4-isopropyloxyphenylthio, 4-methylthiophenylthio, 6-aminohexylamino.

7. Compound as claimed in any of the claims 1-3, wherein
20 R₁ is Cl, Br or S-aryl.

8. Compound as claimed in claim 7, wherein
25 R₁ is Cl, Br, 4-chlorophenylthio, 4-fluorophenylthio, naphtyl-2-thio, phenylthio, 4-nitrophenylthio, 4-methoxyphenylthio, pyridinyl-2-thio, 4-methylphenylthio, 4-isopropylphenylthio, 2,3,5,6-tetrafluoro-phenylthio, 4-hydroxyphenylthio, or 2,4-dichloro-phenylthio.

9. Compound as claimed in claim 7 or 8, wherein
30 R₁ is 4-chlorophenylthio, 4-fluorophenylthio, 4-methoxyphenylthio, 4-methylphenylthio, 4-hydroxyphenylthio.

10. Compound as claimed in any of the claims 1-9,
wherein
R₂ is H, halogen, azido, O-alkyl, S-alkyl.

11. Compound as claimed in any of the claims 1-10,
wherein

R₂ is H, Cl, Br, I, O-alkyl, S-methyl, S-ethyl.

5 12. Compound as claimed in any of the claims 1-11,
wherein

R₂ is H, Cl, Br, O-methyl, O-ethyl, O-propyl, O-butyl,
O-isobutyl, S-methyl.

10 13. Compound as claimed in any of the claims 1-13,
wherein

R₂ is O-methyl, O-ethyl, O-propyl, O-butyl, O-isobutyl.

14. Compound as claimed in any of the claims 1-13,
15 wherein

R₂ is O-methyl.

15. Compound as claimed in any of the claims 1-14,
wherein

20 R₃ is amino, NH-alkyl, N-bisalkyl, NH-aryl, NH-alkyl-
carbamoyl, N-bisalkyl-carbamoyl, amido-alkyl, amido-aryl, OH.

16. Compound as claimed in any of the claims 1-15,
wherein

25 R₃ is amino, NH-phenyl, NH-tert-butyl, NH-tert-
butylcarbamoyl, NH-phenylcarbamoyl, NH-acetyl, NH-propionyl,
NH-butyryl, NH-benzoyl, NH-benzyl, NH-phenylethyl, NH-
phenylpropyl, N-bismethyl, N-bisethyl, OH.

30 17. Compound as claimed in any of the claims 1-16,
wherein

R₃ is amino, NH-phenyl, NH-tert-butyl, NH-tert-
butylcarbamoyl, NH-phenylcarbamoyl; NH-butyryl, NH-benzoyl,
NH-benzyl, N-bismethyl, N-bisethyl, OH.

18. Compound as claimed in any of the claims 1-17,
wherein

5 R₃ is amino, NH-phenyl, NH-tert-butyl, NH-tert-
butylcarbamoyl, NH-benzoyl, N-bismethyl, OH.

19. Compound as claimed in any of the claims 1-18,
wherein R₃ is amino, NH-tert-butyl.

10 20. Compound as claimed in any of the claims 1-19,
wherein R₄ and R₅ are independently O(H) or S(H).

21. Compound as claimed in any of the claims 1-20,
wherein R₄ and R₅ are O(H).

15 22. Compound as claimed in any of the claims 1-21,
wherein the compound is selected from the group consisting 8-
bromo-2'-deoxyadenosine-3',5'-cyclic monophosphate;
8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic
20 monophosphate; 8-(4-chloro-phenylthio)-N⁶-phenyl-2'-
deoxyadenosine-3',5'-cyclic monophosphate;
8-bromo-2'-O-methyladenosine-3',5'-cyclic monophosphate;
8-(4-chloro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic
monophosphate; 8-methylamino-2'-O-methyladenosine-3',5'-
25 cyclic monophosphate; 8-methylthio-2'-O-methyladenosine-
3',5'-cyclic monophosphate; 8-(4-fluoro-phenylthio)-2'-O-
methyladenosine-3',5'-cyclic monophosphate;
8-(4-methyl-cumarinyl-7-thio)-2'-O-methyladenosine-3',5'-
cyclic monophosphate; 8-(naphtyl-2-thio)-2'-O-
30 methyladenosine-3',5'-cyclic monophosphate;
8-phenylthio-2'-O-methyladenosine-3',5'-cyclic monophosphate;
8-(4-nitro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic
monophosphate;

8-(2-amino-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-benzylthio-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-n-hexylthio-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-phenylethylamino-2'-O-methyladenosine-3',5'-cyclic monophosphate;

8-(4-methoxy-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-isopropylthio-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-(benzimidazolyl-2-thio)-2'-O-methyladenosine-3',5'-cyclic monophosphate;

8-(2-hydroxy-ethylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-ethylthio-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-(2-amino-ethylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate;

8-(pyridinyl-2-thio)-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-(benzothiazolyl-2-thio)-2'-O-methyladenosine-3',5'-cyclic monophosphate;

8-(4-methyl-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-(3-methoxy-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate;

8-(4-isopropyl-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-(2,3,5,6-tetrafluoro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate;

8-(4-hydroxy-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-(2,4-dichloro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate;

8-(4-chloro-phenylthio)-2'-(N,N-dimethyl)-carbamoyl-adenosine-3',5'-cyclic monophosphate;

8-methoxy-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-benzyloxy-2'-O-methyladenosine-3',5'-cyclic monophosphate;

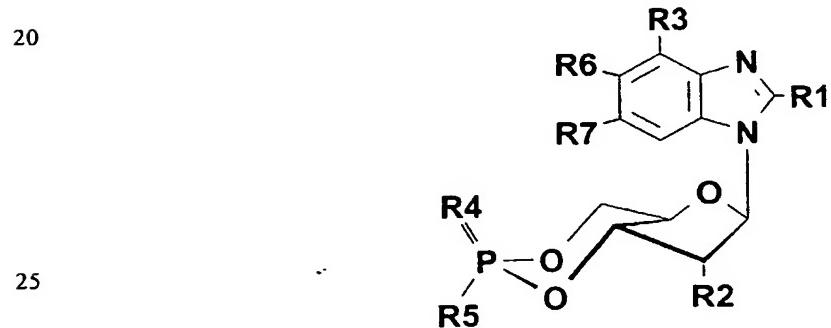
8-bromo-2'-O-methyladenosine-3',5'-cyclic monophosphorothioate, Sp-isomer; 8-bromo-2'-O-methyladenosine-3'-5'-cyclic monophosphorothioate, Rp-isomer; 8-(4-chloro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphorothioate, Sp-isomer; 8-(4-chloro-phenylthio)-2'-

O-methyladenosine-3',5'-cyclic monophosphorothioate, Rp-isomer; 8-bromo-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Rp-isomer; 8-bromo-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Sp-isomer;

5 8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Rp-isomer; 8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Sp-isomer; and 8-cyclohexylamino-2'-deoxyadenosine-3',5'-cyclic monophosphate; 8-chloro-2'-O-methyladenosine-3',5'-cyclic phosphate; N⁶-tert-butyl-8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic monophosphate; 5,6-Dichloro-1-β-D-ribofuranosyl-2'-O-methylbenzimidazole-3',5'-cyclic monophosphate;

10

15 23. Compound as claimed in claims 1-21, wherein the deaza-analogue is a compound having the structural formula II:



wherein

R1-R5 are as defined in any of the claims 1-21, and

30 wherein

R6 and R7 can be independently H, halogen, alkyl, nitro, amino, and/or alkoxy.

24. Compound as claimed in claim 23, wherein

R1-R3 are as defined in any of the claims 1-21;
R4 and R5 can be independently O or S; and
R6 and R7 can be independently F, Cl, Br or I.

5 25. Compound as claimed in claim 23 or 24, wherein R6
and R7 are Cl.

26. Compound as claimed in claim 23, 24 or 25, wherein
R2 is O-alkyl.

10 27. Compound as claimed in any of the claims 23-26,
wherein

R1 and R3 are hydrogen;
R2 is O-alkyl; and
15 R6 and R7 are Cl.

28. Compound as claimed in any of the claims 23-27,
wherein the deaza-analogue is selected from the group
consisting of 1-deaza-adenine analogues, 3-deaza-adenine
20 analogues, 7-deaza-adenine analogues, 1,3-dideaza-adenine
analogues, 1,7-dideaza-adenosine analogues and benzimidazole
analogues, preferably 5,6-dichlorobenzimidazole.

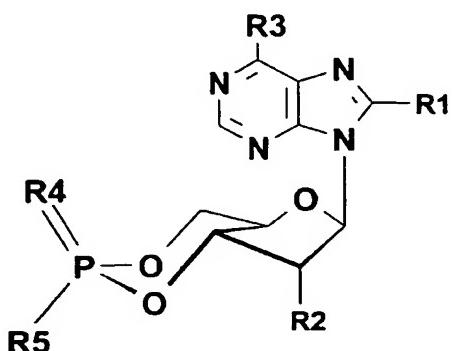
29. Compound as claimed in any of the claims 1-28 for
modulating the activity of exchange proteins directly
activated by cAMP (Epacs).

30. Compound as claimed in any of the claims 1-28 for
discriminating between Epac- and PKA-mediated signal
transduction pathways.

31. Compound as claimed in any of the claims 1-30 for
use as a medicament.

32. Pharmaceutical composition comprising one or more of the compounds as claimed in claims 1-31, and one or more pharmaceutically acceptable excipients.

5 33. Use of a compound having the structural formula (I)



wherein,

R₁ can be independently H, halogen, azido, alkyl, aryl,
10 amido-alkyl, amido-aryl, OH, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, SeH, Se-alkyl, Se-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, cycloalkylamino;

R₂ can be independently H, halogen, azido, O-alkyl, S-alkyl, Se-alkyl, NH-alkyl, N-bisalkyl, alkyl-carbamoyl,
15 cycloalkylamino, silyl;

R₃ can be independently H, halogen, OH, azido, amido-alkyl, amido-aryl, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, NH-alkyl-carbamoyl, cycloalkylamino;

20 and wherein

R₄ is O(H) or S(H); and

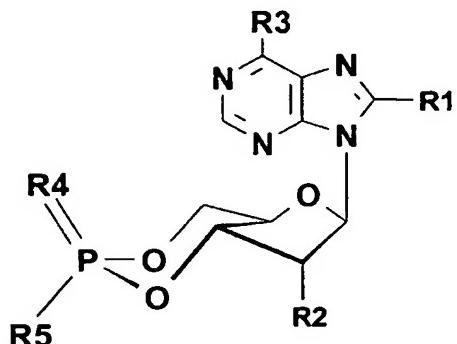
R₅ is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; or

25 R₄ is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; and

R_5 is O(H) or S(H); and pharmaceutically acceptable salts, esters, and/or solvates thereof as a medicament.

34. Use of a compound having the structural formula (I)

5



wherein,

10 R_1 can be independently H, halogen, azido, alkyl, aryl, amido-alkyl, amido-aryl, OH, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, SeH, Se-alkyl, Se-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, cycloalkylamino;

15 R_2 can be independently H, halogen, azido, O-alkyl, S-alkyl, Se-alkyl, NH-alkyl, N-bisalkyl, alkyl-carbamoyl, cycloalkylamino, silyl;

20 R_3 can be independently H, halogen, OH, azido, amido-alkyl, amido-aryl, O-alkyl, O-aryl, SH, S-alkyl, S-aryl, amino, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl, NH-alkyl-carbamoyl, cycloalkylamino;

and wherein

25 R_4 is O(H) or S(H); and

R_5 is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; or

R_4 is O(H), S(H), amino, H, alkyl, O-alkyl, O-aryl, S-alkyl, S-aryl, NH-alkyl, NH-aryl, N-bisalkyl, N-bisaryl; and

30 R_5 is O(H) or S(H); and pharmaceutically acceptable salts, esters, and/or solvates thereof in the manufacture of a medicament for the treatment of human diseases.

35. Use as claimed in claim 33 or 34, wherein
R₁ is H, halogen, azido, O-alkyl, O-aryl, S-alkyl, S-
aryl, NH-alkyl, NH-aryl, Se-aryl.

5

36. Use as claimed in claim 33, 34 or 35, wherein
R₁ is H, halogen, azido, O-alkyl, O-aryl, S-alkyl, S-
aryl, NH-alkyl, NH-aryl, Se-aryl.

10 37. Use as claimed in any of the claims 33-35, wherein
R₁ is H, Br, Cl, I, azido, 2-chlorophenylthio, 3-
chlorophenylthio, 4-chlorophenylthio, 2-bromophenylthio, 3-
bromophenylthio, 4-bromophenylthio, methylamino, methylthio,
ethylthio, n-propylthio, n-butylthio, n-pentylthio, n-
hexylthio, 2-fluorophenylthio, 3-fluorophenylthio, 4-
fluorophenylthio, 4-methylcumarinyl, naphtyl-2-thio,
phenylthio, 4-nitrophenylthio, 2-aminophenylthio, 3-
aminophenylthio, 4-aminophenylthio, benzylthio,
phenylethylamino, 3-phenyl-propylamino, 2-methoxyphenylthio,
20 3-methoxyphenylthio, 4-methoxyphenylthio, isopropylthio,
benzimidazolyl-2-thio, 2-hydroxyethylthio, 2-aminoethylthio,
pyridinylthio, benzothiazolylthio, 2-methylphenylthio, 3-
methylphenylthio, 4-methylphenylthio, 2-isopropylphenylthio,
4-isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-
hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy, ethoxy,
25 propioxy, butoxy, benzyloxy, 4-methylbenzyloxy, 4-
methoxybenzyloxy, 4-fluorobenzyloxy, 4-chlorobenzyloxy, 4-
bromobenzyloxy, phenoxy, cyclohexylamino, benzylamino,
phenylseleno, 4-isopropyloxyphenylthio, 4-
30 methylthiophenylthio, 6-aminohexylamino, 2,3-
dichlorophenylthio, 2,5-dichlorophenylthio, 2,4-
difluorophenylthio, 2,5-dimethoxyphenylthio, 2,5-
dimethylthiophenylthio, 2,6-dimethylthiophenylthio, 2,6-
dichlorophenylthio.

38. Use as claimed in any of the claims 33-37, wherein
R₁ is H, Br, Cl, azido, 2-chlorophenylthio, 3-
chlorophenylthio, 4-chlorophenylthio, 2-bromophenylthio, 3-
5 bromophenylthio, 4-bromophenylthio, methylamino, methylthio,
ethylthio, n-propylthio, n-butylthio, n-pentylthio, n-
hexylthio, 2-fluorophenylthio, 3-fluorophenylthio, 4-
fluorophenylthio, 4-methylcumarinyl, naphtyl-2-thio,
phenylthio, 4-nitrophenylthio, 2-aminophenylthio, 3-
10 aminophenylthio, 4-aminophenylthio, benzylthio,
phenylethylamino, 2-methoxyphenylthio, 3-methoxyphenylthio,
4-methoxyphenylthio, isopropylthio, benzimidazolyl-2-thio, 2-
hydroxyethylthio, 2-aminoethylthio, pyridinylthio,
benzothiazolylthio, 2-methylphenylthio, 3-methylphenylthio,
15 4-methylphenylthio, 2-isopropylphenylthio, 4-
isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-
hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy,
benzyloxy, cyclohexylamino, benzylamino, phenylseleno, 4-
isopropyloxyphenylthio, 4-methylthiophenylthio, 6-
20 aminohexylamino, 2,3-dichlorophenylthio, 2,5-
dichlorophenylthio, 2,4-difluorophenylthio, 2,5-
dimethoxyphenylthio, 2,5-dimethylthiophenylthio, 2,6-
dimethylthiophenylthio, 2,6-dichlorophenylthio.

25 39. Use as claimed in any of the claims 33-38, wherein
R₁ is H, Br, Cl, azido, 4-chlorophenylthio, methylamino,
methylthio, 4-fluorophenylthio, 4-methylcumarinyl, naphtyl-2-
thio, phenylthio, 4-nitrophenylthio, 2-aminophenylthio,
benzylthio, n-hexylthio, phenylethylamino, 4-
30 methoxyphenylthio, isopropylthio, benzimidazolyl-2-thio, 2-
hydroxyethylthio, ethylthio, 2-aminoethylthio, pyridinylthio,
benzothiazolylthio, 4-methylphenylthio, 3-methoxyphenylthio,
4-isopropylphenylthio, 2,3,5,6-tetrafluorophenylthio, 4-
hydroxyphenylthio, 2,4-dichlorophenylthio, methoxy,

benzyloxy, cyclohexylamino, benzylamino, phenylseleno, 4-isopropoxyphenylthio, 4-methylthiophenylthio, 6-aminohexylamino.

5 40. Use as claimed in any of the claims 33-39, wherein
R1 is Cl, Br or S-aryl.

41. Use as claimed in claim 40, wherein
R1 is Cl, Br, 4-chlorophenylthio, 4-fluorophenylthio,
10 naphtyl-2-thio, phenylthio, 4-nitrophenylthio, 4-methoxyphenylthio, pyridinyl-2-thio, 4-methylphenylthio, 4-isopropylphenylthio, 2,3,5,6-tetrafluoro-phenylthio, 4-hydroxyphenylthio, or 2,4-dichloro-phenylthio.

15 42. Use as claimed in claim 40 or 41, wherein
R1 is 4-chlorophenylthio, 4-fluorophenylthio, 4-methoxyphenylthio, 4-methylphenylthio, 4-hydroxyphenylthio.

43. Use as claimed in any of the claims 33-42, wherein
20 R2 is H, halogen, azido, O-alkyl, S-alkyl.

44. Use as claimed in any of the claims 33-43, wherein
R2 is H, Cl, Br, I, O-alkyl, S-methyl, S-ethyl.

25 45. Use as claimed in any of the claims 33-44, wherein
R2 is H, Cl, Br, O-methyl, O-ethyl, O-propyl, O-butyl,
O-isobutyl, S-methyl.

46. Use as claimed in any of the claims 33-45, wherein
30 R2 is O-methyl, O-ethyl, O-propyl, O-butyl, O-isobutyl.

47. Use as claimed in any of the claims 33-45, wherein
R2 is O-methyl.

48. Use as claimed in any of the claims 33-47, wherein
R₃ is amino, NH-alkyl, N-bisalkyl, NH-aryl, NH-alkyl-
carbamoyl, N-bisalkyl-carbamoyl, amido-alkyl, amido-aryl, OH.

5 49. Use as claimed in any of the claims 33-48, wherein
R₃ is amino, NH-phenyl, NH-tert-butyl, NH-tert-
butylcarbamoyl, NH-phenylcarbamoyl, NH-acetyl, NH-propionyl,
NH-butyryl, NH-benzoyl, NH-benzyl, NH-phenylethyl, NH-
phenylpropyl, N-bismethyl, N-bisethyl, OH.

10 50. Use as claimed in any of the claims 33-49, wherein
R₃ is amino, NH-phenyl, NH-tert-butyl, NH-tert-
butylcarbamoyl, NH-phenylcarbamoyl; NH-butyryl, NH-benzoyl,
NH-benzyl, N-bismethyl, N-bisethyl, OH.

15 51. Use as claimed in any of the claims 33-50, wherein
R₃ is amino, NH-phenyl, NH-tert-butyl, NH-tert-
butylcarbamoyl, NH-benzoyl, N-bismethyl, OH.

20 52. Use as claimed in any of the claims 33-51, wherein
R₃ is amino, NH-tert-butyl.

53. Use as claimed in any of the claims 33-51, wherein
R₄ and R₅ are independently O(H) or S(H).

25 54. Use as claimed in any of the claims 33-51, wherein
R₄ and R₅ are O(H).

30 55. Use as claimed in any of the claims 33-54, wherein
the compound is selected from the group consisting 8-bromo-
2'-deoxyadenosine-3',5'-cyclic monophosphate;
8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic
monophosphate; 8-(4-chloro-phenylthio)-N⁶-phenyl-2'-
deoxyadenosine-3',5'-cyclic monophosphate;

8-bromo-2'-O-methyladenosine-3',5'-cyclic monophosphate;
8-(4-chloro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic
monophosphate; 8-methylamino-2'-O-methyladenosine-3',5'-
cyclic monophosphate; 8-methylthio-2'-O-methyladenosine-
5 3',5'-cyclic monophosphate; 8-(4-fluoro-phenylthio)-2'-O-
methyladenosine-3',5'-cyclic monophosphate;
8-(4-methyl-cumarinyl-7-thio)-2'-O-methyladenosine-3',5'-
cyclic monophosphate; 8-(naphthyl-2-thio)-2'-O-
methyladenosine-3',5'-cyclic monophosphate;
10 8-phenylthio-2'-O-methyladenosine-3',5'-cyclic monophosphate;
8-(4-nitro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic
monophosphate;
8-(2-amino-phenylthio)-2'-O-methyladenosine-3',5'-cyclic
monophosphate; 8-benzylthio-2'-O-methyladenosine-3',5'-cyclic
15 monophosphate; 8-n-hexylthio-2'-O-methyladenosine-3',5'-
cyclic monophosphate; 8-phenylethylamino-2'-O-
methyladenosine-3',5'-cyclic monophosphate;
8-(4-methoxy-phenylthio)-2'-O-methyladenosine-3',5'-cyclic
monophosphate; 8-isopropylthio-2'-O-methyladenosine-3',5'-
20 cyclic monophosphate; 8-(benzimidazolyl-2-thio)-2'-O-
methyladenosine-3',5'-cyclic monophosphate;
8-(2-hydroxy-ethylthio)-2'-O-methyladenosine-3',5'-cyclic
monophosphate; 8-ethylthio-2'-O-methyladenosine-3',5'-cyclic
monophosphate; 8-(2-amino-ethylthio)-2'-O-methyladenosine-
25 3',5'-cyclic monophosphate;
8-(pyridinyl-2-thio)-2'-O-methyladenosine-3',5'-cyclic
monophosphate; 8-(benzothiazolyl-2-thio)-2'-O-
methyladenosine-3',5'-cyclic monophosphate;
8-(4-methyl-phenylthio)-2'-O-methyladenosine-3',5'-cyclic
30 monophosphate; 8-(3-methoxy-phenylthio)-2'-O-methyladenosine-
3',5'-cyclic monophosphate;
8-(4-isopropyl-phenylthio)-2'-O-methyladenosine-3',5'-cyclic
monophosphate; 8-(2,3,5,6-tetrafluoro-phenylthio)-2'-O-
methyladenosine-3',5'-cyclic monophosphate;

8-(4-hydroxy-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate; 8-(2,4-dichloro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphate;

8-(4-chloro-phenylthio)-2'-(N,N-dimethyl)-carbamoyl-
5 adenosine-3',5'-cyclic monophosphate;

8-methoxy-2'-O-methyladenosine-3',5'-cyclic monophosphate;

8-benzyloxy-2'-O-methyladenosine-3',5'-cyclic monophosphate;

8-bromo-2'-O-methyladenosine-3',5'-cyclic
monophosphorothioate, Sp-isomer; 8-bromo-2'-O-
10 methyladenosine-3'-5'-cyclic monophosphorothioate, Rp-isomer,

8-(4-chloro-phenylthio)-2'-O-methyladenosine-3',5'-cyclic monophosphorothioate, Sp-isomer; 8-(4-chloro-phenylthio)-2'-
O-methyladenosine-3',5'-cyclic monophosphorothioate, Rp-
isomer; 8-bromo-2'-deoxyadenosine-3',5'-cyclic
15 monophosphorothioate, Rp-isomer; 8-bromo-2'-deoxyadenosine-
3',5'-cyclic monophosphorothioate, Sp-isomer;

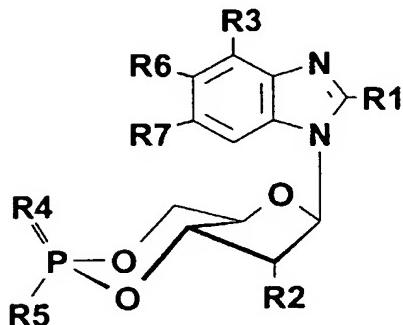
8-(4-chloro-phenylthio)-2'-deoxyadenosine-3',5'-cyclic monophosphorothioate, Rp-isomer; 8-(4-chloro-phenylthio)-2'-
deoxyadenosine-3',5'-cyclic monophosphorothioate, Sp-isomer;

20 and 8-cyclohexylamino-2'-deoxyadenosine-3',5'-cyclic monophosphate; 8-chloro-2'-O-methyladenosine-3',5'-cyclic monophosphate, N⁶-tert-butyl-8-(4-chloro-phenylthio)-2'-
deoxyadenosine-3',5'-cyclic monophosphate.

56. Use as claimed in any of the claims 21-29, wherein
 the deaza analogue is a compound having the structural
 formula II:

5

10



15 wherein

R1-R5 are as defined in any of the claims 1-21, and
 wherein

R6 and R7 can be independently H, halogen, alkyl, nitro,
 amino, and/or alkoxy.

20

57. Use as claimed in claim 56, wherein
 R1-R3 are as defined in any of the claims 1-21;
 R4 and R5 can be independently O or S; and
 R6 and R7 can be independently F, Cl, Br or I.

25

58. Use as claimed in claim 56 or 57, wherein R6 and R7
 are Cl.

59. Use as claimed in claim 56, 57 or 58, wherein R2 is
 30 O-alkyl.

60. Use as claimed in any of the claims 56-59, wherein
 R1 and R3 are hydrogen;
 R2 is O-alkyl; and

R6 and R7 are Cl.

61. Use as claimed in any of the claims 56-60, wherein
the deaza-analogue is selected from the group consisting of
5 1-deaza-adenine analogues, 3-deaza-adenine analogues, 7-
deaza-adenine analogues, 1,3-dideaza-adenine analogues, 1,7-
dideaza-adenosine analogues and benzimidazole analogues,
preferably 5,6-dichlorobenzimidazole.

10 62. Use as claimed in any of the claims 33-61 in the
manufacture of a medicament for the treatment of cancer.

15 63. Use as claimed in any of the claims 33-61 in the
manufacture of a medicament for the treatment of chronic
inflammation.

64. Use as claimed in any of the claims 33-61 in the
manufacture of a medicament for the treatment of thrombosis.

20 65. Use as claimed in any of the claims 33-61 in the
manufacture of a medicament for the treatment of type-2
diabetes mellitus.